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R. E. Root, U. S. Naval Academy, Annapolis, Md.
W. F. Shenton, Johns Hopkins University, Baltimore, Md.
E. R. Smith, The Park School, Baltimore, Md.
J. J. Tanzola, U. S. Naval Academy, Annapolis, Md.
H. R. Tolley, U. S. Dept. of Agriculture, Washington, D. C.

After the adoption of a constitution for the Section, the following officers were elected for the coming year: President, Professor ABRAHAM COHEN, of Johns Hopkins University; Secretary-Treasurer, Professor RALPH E. ROOT, U. S. Naval Academy; Member of the Executive Committee, Mr. WALTER D. LAMBERT, U. S. Coast and Geodetic Survey.

The program consisted of two papers, each followed by a discussion. The first paper, by Professor R. E. Root, was on "The aims and possibilities of this local section," and the discussion was led by Professor A. E. Landry, Mr. W. D. Lambert and Professor Frank Morley. Mr. E. R. Smith and Professor A. B. Coble also took part in the discussion. The second paper, by Professor L. S. Hulburt, was on "A college or university course for teachers of secondary mathematics," and the discussion was led by Professor Clara L. Bacon and Mr. E. R. Smith.

After the program there was a social hour at the Hopkins Club, where the members of the section were the guests of the University at a luncheon.

The constitution of the section provides for holding at least two meetings each year, one in the spring and another in the fall, and the executive committee may call additional meetings when desirable.

RALPH E. ROOT,
Secretary.

SECOND ANNUAL MEETING OF THE OHIO SECTION.

The second annual meeting of the Ohio Section of the Mathematical Association of America was held at the Ohio State University, Columbus, on April 6, 1917, in connection with the meetings of the Ohio College Association, The Ohio Academy of Science, The Ohio Society of College Teachers of Education, and The Association of Ohio Teachers of Mathematics and Science. Chairman Focke occupied the chair, being relieved by Professor R. B. Allen for an interval.

The following thirty-four persons were registered, all but the last six being members of the Association:

R. B. Allen, Kenyon College; F. Anderegg, Oberlin College; W. E. Anderson, Wittenberg College; G. N. Armstrong, Ohio Wesleyan University; C. L. Arnold, Ohio State University; C. B. Austin, Ohio Wesleyan University; Grace M. Bareis, Ohio State University; Mrs. W. E. Beckwith, Western Reserve University; R. D. Bohannan, Ohio State University; Louis Brand, University of Cincinnati; A. G. Caris, Defiance College; O. L. Dustheimer, Baldwin-Wallace College; Theo. M. Focke, Case School of Applied Science; Harriet E. Glazier, Western College for Women; M. E. Graber, Heidelberg University; Harris

Hancock, University of Cincinnati; E. J. Hirschler, Bluffton College; H. W. Kuhn, Ohio State University; C. C. Morris, Ohio State University; Anna H. Palmie, Western Reserve University; S. E. Rasor, Ohio State University; Hortense Rickard, Ohio State University; Mary E. Sinclair, Oberlin College; S. A. Singer, Capital University; K. D. Swartzel, Ohio State University; C. J. West, Ohio State University; Forbes B. Wiley, Denison University; D. T. Wilson, Case School of Applied Science.

Non-members: P. Biefeld, Denison University; Jacob Bowers, Columbus Trades School; L. D. Parker, Cedarville College; Anna B. Peckham, Denison University; T. Elmer Trott, Mt. Union College; R. B. Wildermuth, Capital University.

The following program was carried out as arranged:

Friday Afternoon.

1. Chairman's Address. "A geometrical presentation of Taylor's series." Professor T. M. FOCKE, Case School of Applied Science.
2. "The application of mathematics to the biological and social sciences." Professor C. J. WEST, Ohio State University.
3. "The actual and apparent path of comet *b* 1916 (Wolf), and the actual path of Mellish's comet (1917*a*)." Professor PAUL BIEFELD, Denison University (Introduced by the Chairman).
4. "The application of Fourier's series to an isoperimetric problem." Professor E. J. HIRSCHLER, Bluffton College.
5. "Formal seminvariants of binary forms." Professor C. C. MORRIS, Ohio State University.
6. "Senior year mathematics for engineering students." Professor LOUIS BRAND, University of Cincinnati.

Friday Evening.

An informal meeting in the nature of a round table was held at the Ohio Union. The following subjects were proposed for discussion:

1. Should there be any absolute requirements in mathematics for the A.B. degree beyond one year of high school algebra and one of plane geometry?
2. How to discover and encourage real mathematical ability.
3. Continuation of the discussion of the afternoon papers.

Each of the first three papers in the afternoon program was illustrated by a number of lantern slides. A photograph of those present at the close of the afternoon meeting was taken. The members of the section dined together at the Ohio Union on Friday evening. Many remained and participated in the meetings of the Association of Ohio Teachers of Mathematics and Science on Saturday.

At the business meeting of the Section, the following officers were elected for the ensuing year:

Chairman, Professor Forbes B. Wiley, Denison University.

Secretary-Treasurer, Professor G. N. Armstrong, Ohio Wesleyan University.

Third member of the Executive Committee, Professor C. L. Arnold, Ohio State University.

Professor Morris emphasized the opportunity and the responsibility of the Ohio Section in connection with the meetings of the American Mathematical Society and the Mathematical Association of America to be held in Cleveland, September 4th to 7th, 1917, and of the Central Association of Science and Mathematics Teachers at Columbus, November 30th to December 1st, 1917.

ABSTRACTS OF PAPERS AND DISCUSSIONS.

1. In his paper on "A geometrical presentation of Taylor's series," Professor Focke suggests that the order of contact of curves be studied before taking up Taylor's theorem. It is then proposed to lead up to the Maclaurin expansion by finding the equation of a curve of the form

$$y = A + Bx + Cx^2 + Dx^3 + \cdots + Rx^n,$$

which shall have a contact of the nth order with $y = f(x)$ at the point where $x = 0$. Then, since the values of A, B, C, etc., turn out to be independent of n, the order of contact of the two curves can be made as high as we choose, provided $f(x)$ and whichever of its derivatives are needed exist when $x = 0$. The necessity of determining the interval of convergency when the number of terms increases without limit was shown by diagrams.

2. Professor West noted that in statistical work which is primarily a matter of accurate counting there is little need for more than the simplest processes of arithmetic. The attempt to draw conclusions true for a whole population, when only a limited number of individuals can be observed, gives rise to a multiplicity of involved problems which cannot be resolved without the aid of highly developed methods. Have real wages increased during the last twenty years; that is, will the laborer's pay purchase more now than at that time? Has the yield of a certain strain of corn been increased? These are typical statistical problems of the more recent kind. In this paper the development of statistical methods is traced and the mathematical problems which arise are outlined. The opportunities which the theory of mathematical statistics offers as a field for mathematical research is especially emphasized.

3. Professor Biefeld presented the report on comets not as a contribution in itself, but rather to suggest an interesting problem for the teacher in practical astronomy or celestial mechanics to be solved by students in his classes in connection with the study of orbits. Namely; the elements of a newly discovered comet being given, to construct:

1. A diagram of the actual path of the comet about the sun to scale. For this it is necessary to compute the true anomaly and radii-vectores for a series of dates.

2. To compute the ephemeris giving the true right ascensions and declinations

and the geocentric distances of the comet, and from the former to plot the apparent path among the fixed stars. It affords an interesting exercise, then, to watch the movement of an object in the sky, find its positions, and compare with computations.

As there are from 2 to 10 telescopic comets every year, new and interesting variations of the problem are brought out. The solution of the problem was illustrated by slides in relation to the above comets.

4. Professor Hirschler outlined a proof for the theorem that a circle encloses a larger area than any other simply closed regular curve of the same length. The curve is represented in parametric form with the length of arc measured from a fixed point as parameter. With the help of a number of recent theorems on Fourier's series its area is calculated in terms of the coefficients of the Fourier expansions for $x = \varphi(s)$ and $y = \psi(s)$. This area is compared with the area of a circle of length l found by integrating the equation $x'^2 + y'^2 = 1$ in terms of the same coefficients.

5. In his paper on "Formal seminvariants of binary forms," Professor Morris showed how the theory of numbers had been applied to the theory of algebraic invariants and seminvariants. He exhibited several fundamental systems for the cubic for different moduli and spoke of the progress that has been made on the quartic.

6. Three types of courses for senior engineering students were considered by Professor Brand:

1. Courses dealing with some phase of engineering with a well developed mathematical theory.
2. Courses presenting a branch of applied mathematics serviceable in engineering practice.
3. Courses in pure mathematics chosen to introduce important concepts not dealt with in elementary courses. As representative of the first type, a course given at the University of Cincinnati on the analysis of statically indeterminate structures was described in some detail. After urging the claims of vector analysis under the second class, the last was exemplified by a course on the number system of algebra, the material being outlined and its advantages discussed.

The evening meeting, held in the large committee room of the Ohio Union, was attended by about twenty-five persons. The discussion of the first topic was so animated and so interesting that the others were not reached and adjournment was forced by necessity of closing the building. Professors Caris, Allen, Bohannan, Morris, Wiley, West, Graber, Glazier, and Anderegg participated in the discussion, both sides of the question being represented. The fact that authority and tradition no longer shield the subjects of the educational curriculum from questioning and attack was emphasized. The claims and counterclaims as to the value of the study of mathematics found adequate presentation, as did also those of the more recently introduced subjects of study. While strong faith in the validity of the claims of mathematics was apparent, yet there was evident a deep conviction that the teacher could justify himself and his subject only by intelligent, sympathetic, and earnest teaching.

G. N. Armstrong,
Secretary.

BOOK REVIEWS.

Send all communications to W. H. Bussey, University of Minnesota.

Functions of a Complex Variable. By E. J. Townsend, Professor and Head of the Department of Mathematics in the University of Illinois. Henry Holt and Company, New York, 1915. vii + 384 pages.

The present volume is one of the American Mathematical Series of which several have already appeared and of which Professor Townsend is the editor-in-chief. There are but few books in the English language that treat primarily of functions of a complex variable, and when we seek those of an elementary nature which are suitable for an introductory course, to be used by students who have had no further mathematical training than what is generally given in a first course in calculus, the number is very limited. There are the well-known texts, "*Introduction to Analytic Functions*" by Harkness and Morley and "*Theory of Functions of a Complex Variable*" by Burkhardt, translated by Rasor. A book as carefully and well written as the present volume, and which deals with such a fundamental and important field in mathematics, will undoubtedly be well received by both teachers and students.

In Chapter I there is a brief discussion of rational and irrational numbers; then follow the introduction of the complex number and the graphical representation of the same. The fundamental operations of addition, subtraction, multiplication, division, raising to powers, and the extraction of roots are explained for complex numbers, both analytically and graphically. The limitations of the graphic method for extraction of roots are illustrated by means of an example.

The beginning of Chapter II is devoted to the definitions and classifications of functions. The notions and properties of limits of sequences of real numbers are briefly stated, and the ideas are then extended to the realm of complex numbers. In article 13 several fundamental theorems relating to ordinary continuity of $f(z)$ with respect to z, uniform continuity in a region S, and uniform convergence along an arc are stated and proved.

In Chapter III differentiation and integration are taken up. Line integrals and their more general properties are discussed. The path of integration is defined as a curve having the property that it is monotone by segments of a finite number. This lends clearness to the discussions that follow, and obviates difficulties that would arise if a more general curve were chosen. Green's theorem for functions of two real variables, Cauchy's theorem, Cauchy's integral